

## **CRD EFFICACY WORKING DOCUMENT SUMMARISING UK MAJOR ‘PESTS’<sup>1</sup> (DISEASES, PESTS AND WEEDS) ON A RANGE OF UK CROPS**

This working document provides a summary of the range of ‘major’ **insect pests, diseases and weeds** in the UK for a number of crops. It also provides some indication of the required number of **fully supportive effectiveness trials results (crop safety is not specifically addressed here)**. This working document is part of a series of guidance under development, or already available to be used in trials planning, providing reasoned cases for the relevance of data in supporting UK uses and drafting appropriate UK labels. Where more detailed guidance already exists, information on those crops is not reproduced here, and applicants should refer to the specific guides (list on CRD Efficacy home page). In addition, Efficacy guide ‘Efficacy assessments: UK product labelling and National issues/addenda’ provides information on a number of UK specific issues, including the scheme for supporting differential label claims based on the supporting effectiveness trials data.

In terms of pests and diseases this document primarily covers foliar pests and diseases. In some cases soil pests have also been included; however seed treatments are specifically not covered.

For insect pests, ‘minor’ targets have also been included because it is important to understand the full pest complex across the range of crops. Most insect species have more than one host crops, or there may be relevant data on closely related species. It is therefore possible to consider cross-supporting data sets, particularly where there are a limited number of results on a specific crop/target use. Understanding the relevant UK insect species facilitates applicants in using this approach, with a relevant reasoned argument, and drafting an appropriate UK GAP and label. It is also important because there are many insect species which may be present on a crop but do not have a sufficient adverse impact that justifies chemical control measures. This includes examples where the species is a major pest in another country. It is therefore important in ensuring PPP insecticides are used in a sustainable fashion.

In defining what is ‘major’ CRD considered a range of factors, including: area of crop grown, the area of crop sprayed, the importance of the pest (frequency, distribution, economic impact, difficulty in control), and a range of agronomic factors as well as expert judgement. For major weed species inclusion was based on their competitiveness compared to the crop, and the extent to which they reduce crop yield, quality, and delay or interfere with crop harvest or cause problems with grazing animals by inhibiting feeding, poisoning or tainting milk.

A detailed explanation is provided in the standard EPPO PP1/226 on establishing the number of appropriate effectiveness trials results required. The number of fully supportive, appropriate **effectiveness** results is based around the EPPO (European and Mediterranean Plant Protection Organisation) range for **field uses** of 6 – 15 (major use) or 3 – 6 (minor use). The numbers assume there are no relevant existing supporting data/authorisations (or appropriate extrapolations available), and that it is for an individual UK authorisation (For zonal applications, see relevant EPPO 1/278 guidance). As a general guide PP 1/226 indicates that 10 trials are required to give the necessary high degree of confidence for a

---

<sup>1</sup> The term ‘pest’ is defined in accordance with EPPO general standards, as a generic term to cover insects, diseases, and weeds.

major target in a major crop. It should be noted that to obtain sufficient data it may be necessary to undertake a greater number of trials than specified here since sometimes the ‘pest’ may fail to occur or only occur at low levels etc. It should be noted that EPPO standard, PP 1/296(1), addresses the requirements for low risk plant protection products and they are not covered here. For diseases the individual trial numbers are specified for major diseases.

PP 1/226 also refers to those situations where a reduced number of supportive results may be possible. This is particularly relevant to **insect pests**, which may have a wide range of host crops and data may be available from other crops, and/or have a number of closely related species. For example, there are often several Lepidoptera caterpillars and aphids on a particular crop (whether considered ‘major’ or ‘minor’), and there will be scope to reduce the number of supportive results on individual species. The degree of reduction will depend on a number of factors (e.g. crop agronomy, pest biology), and should always be supported by an appropriate reasoned case. For **weeds** in many cases it will be possible to make a well-argued case for extrapolation from one crop to another if there is sufficient information on the weed control required, the competitiveness of the crop and the factors affecting acceptable weed control in both crops. It may also be possible to extrapolate from one weed species to a related species. For **diseases** they are often specific to a particular crop, however it may be possible for certain diseases to extrapolate and the use of EPPO extrapolations is discussed below.

**Please note:** Whether UK-only, or part of a wider sought authorisation, CRD Efficacy has always accepted data generated from non-UK regions, provided there is an appropriate case for relevance (covering agronomy, pest, climate, edaphic factors, and pest biology). The UK is within the EPPO ‘Maritime’ region (see PP 1/241 ‘Guidance on comparable climates’), and therefore climatic comparability for trials generated within this region requires no further justification. However, it should be remembered other relevant agronomic factors should also be covered in any reasoned case for relevance (described in the standard). In some instances it may be necessary to ensure that the ‘pest’ population tested is relevant to the resistance status in the UK.

Applicants should also refer to relevant EPPO Minor Use tables for a range of crops, covering weeds, diseases, insects (and soil pests) to identify key pest/crop combination (both effectiveness and, where available crop safety). This allows applicants to plan trials programmes, and utilise the data fully to support as wide a range of target/crops as possible for efficacy considerations. There are also a number of ‘generic pest’ tables, which are particularly relevant to UK ‘pests’: slugs (within EPPO 1/95(4)), nematodes, other soil pests (e.g. cutworms, wireworms), spider mites, thrips, whitefly. Although these ‘generic’ pests are identified in the individual tables below, data generated on some of the key major hosts allow wide ranging extrapolation onto other host crops. It is not expected that data will be generated on each individual crop. We would expect to follow EPPO extrapolations but it may also be possible to make additional extrapolations based on good evidence.

This is a working document and if it is considered that amendment is required then please contact us. Please provide a full explanation of the basis on which amendment is required and providing relevant and current information on the pest and crop in the UK etc. This should be sent to [CRDinformationmanagement@hse.gov.uk](mailto:CRDinformationmanagement@hse.gov.uk). We will then carefully consider this information and see if we need to amend this document.

**1. INSECT, NEMATODE, SLUG PESTS****SUGAR BEET**

<b>Pest Group</b>	<b>Major</b>	<b>Minor</b>
Nematodes	Beet cyst nematodes ( <i>Heterodera schachtii</i> ) (HETDSC)	Root knot ( <i>Meloidogyne spp.</i> )
	Free living nematodes (e.g. <i>Trichodorus spp.</i> , <i>Longidorus spp.</i> )	Stem nematodes ( <i>Ditylenchus dipsaci</i> ) (DITYDI)
Aphids	Black bean aphid ( <i>Aphis fabae</i> ) (APHIFA)	
	Peach potato aphid ( <i>Myzus persicae</i> ) (MYZUPE)	
	Potato aphid ( <i>Macrosiphum euphorbiae</i> ) (MACSEU)	
Thrips		Thrips sp. (Onion thrips, - <i>Thrips tabaci</i> (THRITB), field- <i>Thrips angusticeps</i> (THRIAN) and Bean thrips ( <i>Caliothrips fasciatus</i> (HEROFA))
Diptera	Beet leafminer (mangold fly, <i>Pegomya hyoscyami</i> ) (PEGOHY)	
Coleoptera	Wireworm <i>Agriotes sp.</i> (AGRILI)	
		Pygmy beetle ( <i>Atomaria linearis</i> ) (ATOMLI), beet (mangold) flea beetles ( <i>Psylliodes sp.</i> )
Lepidoptera		Cutworm ( <i>Noctuid sp.</i> ),
Hemiptera		Tarnished plant bug ( <i>Lygus rugulipennis</i> ) (LYGURU)
Soil complex	Millipedes, spring tails, symphylids	
Slugs	<i>Deroceras reticulatum</i> (DERORE) and other <i>Deroceras</i> species; <i>Arion hortensis</i> (ARIOHO), <i>A. distinctus</i> (ARIODI) and other <i>Arion</i> species	
	Keeled slugs ( <i>Milax</i> , <i>Tandonia</i> , <i>Boettgerilla</i> )	
Silver Y ( <i>Autographa gamma</i> ) (PYTOGA) and other foliar feeding caterpillars are acknowledged to be present on the crop, but when they do appear, do not usually require chemical measures. As such, not considered a sufficient justification as a 'minor' pest on a PPP (Plant Protection Product) label, they may be species to monitor status in future.		

**ONION AND LEEK** (EPPO Minor Use tables available. Onion is usually the key indicator crop. However included in the table are specific instances where Leek is the key indicator and has been added to facilitate considering *Allium* as a group)

<b>Pest Group</b>	<b>Crop</b>	<b>Major</b>	<b>Minor</b>
Nematodes	Onion, leek	Stem and bulb nematodes ( <i>Ditylenchus dipsaci</i> ) (DITYDI)	
			Free-living nematodes(e.g. <i>Trichodorus</i> spp, <i>Longidorus</i> spp)
Diptera (Flies)	Onion, leek	Bean seed fly ( <i>Delia platura</i> ) (HYLEPL) (seed typically treated)	
	Onion and leek	Onion fly ( <i>Delia antiqua</i> ) (HYLEAN) (seed typically treated)	
	Onion and leek		Allium leafminer ( <i>Phytomyza gymnostoma</i> ) (NAPOGY)
Lepidoptera	Onion		Leek moth ( <i>Acrolepiopsis assectella</i> )
	Leek	Leek moth ( <i>Acrolepiopsis assectella</i> ) (ACROAS)	
Thrips	Onion, leek	Onion thrips ( <i>Thrips tabaci</i> ) (THRITB),	
Beetles	Onion, leek		Wireworms (Agriotes spp)
	Onion, leek		Cutworms (Agrostis spp)

**CARROT (EPPO Minor Use table available for *Umbelliferous* crops)**

<b>Pest group</b>	<b>Major</b>	<b>Minor</b>
Diptera (flies)	Carrot fly ( <i>Psila rosae</i> ) (PSILLRO)	
Capsids		Tarnished plant bug ( <i>Lygus rugulipennis</i> ) (LYGURU)
Aphids	Willow carrot aphid ( <i>Cavariella aegopdii</i> ) (CAVAAE)	
		Parsnip aphid ( <i>C. pastinacae</i> ) (CAVAPA) Peach potato aphid ( <i>Myzus persicae</i> ) (MYZUPE)
Nematodes	Carrot cyst nematodes ( <i>Heterodera carotae</i> ) (HETDCA)	
	Root knot nematode ( <i>Meloidogyne</i> spp e.g <i>hapla</i> )	
	Free living nematodes ( <i>Longidorus</i> , <i>Trichodorus</i> sp)	
Lepidoptera		Various Caterpillar species
Beetles		Cutworm ( <i>Agrostis</i> spp)
		Wireworms ( <i>Agriotes</i> spp.)

**GRASSLAND\***

<b>Pest group</b>	<b>Major</b>	<b>Minor</b>
Diptera (flies)	Frit fly, <i>Oscinella frit</i> (OSCIFR)	
	Leatherjackets, <i>Tipula</i> sp. (TIPULA)	
Beetles	Chafer grubs (MELOME)	Cutworm ( <i>Agrostis</i> spp) (AGSSS)
		Wireworms ( <i>Agriotes</i> spp.) (AGRISP)
Slugs	<i>Deroceras reticulatum</i> (DERORE) and other <i>Deroceras</i> species; <i>Arion</i> <i>hortensis</i> (ARIOHO), <i>A.</i> <i>distinctus</i> (ARIODI) and other <i>Arion</i> species	

\* relevant supporting data may be available from other crops that would reduce the number of grassland trials results. For example, cereals (Frit fly, leather jackets), turf (chafer grubs). For generic pests: cutworm and wireworm refer to EPPO Minor Use Table on soil pests; and slugs refer to, EPPO PP 1/95 – Slugs). Frit fly and slugs are a problem during establishment, and leatherjackets in established pastures.

**PEA (EPPO Minor use table available for legumes)**

<b>Pest group</b>	<b>Major</b>	<b>Minor</b>
Thrips	Field thrips ( <i>Thrips angusticeps</i> ) (THRIAN)	
	Pea thrips ( <i>Kakothrips robustus</i> ) (KAKORO)	
Aphids	Pea aphid ( <i>Acyrtosiphon pisum</i> ) (ACYRON)	
Lepidoptera	Pea moth ( <i>Cydia nigricana</i> ) (LASPNI)	
		Silver Y moth ( <i>Autographa gamma</i> ) (PYTOGA)
Beetle	Pea and bean weevil ( <i>Sitona lineatus</i> ) (SITNLI)	
		Wireworms ( <i>Agriotes</i> spp)
Diptera (flies, midges)		Bean seed fly ( <i>Delia platura</i> ) (HYLEPL)
	Pea midge ( <i>Contarinia pisi</i> ) (CONTPI)	
Nematodes	Pea cyst nematode ( <i>Heterodera goettingiana</i> ) (HETDGO)	

**FIELD BEAN (EPPO Minor use table available for legumes)**

<b>Pest Group</b>	<b>Major</b>	<b>Minor</b>
Aphids	Black bean aphid ( <i>Aphis fabae</i> )	
	Pea aphid ( <i>Acyrtosiphon pisum</i> )	
	Pea and bean weevil ( <i>Sitona lineatus</i> )	
Lepidoptera		Silver y moth
Beetle	Bruchid beetle ( <i>Bruchus rufimanus</i> )	
		Cutworms
Thrips	Field thrips ( <i>Thrips angusticeps</i> )	
Fly		Bean seed fly ( <i>Delia</i> sp)
Nematodes	Stem nematode ( <i>Ditylenchus</i> spp.)	
		Pea cyst nematode ( <i>H. goettingiana</i> ) (HETDGO)

**STRAWBERRY (EPPO Minor Use Table available)**

<b>Pest Group</b>	<b>Major</b>	<b>Minor</b>
Aphids	Strawberry aphid ( <i>Chaetosiphon fragaefolii</i> ) (CHTFSR), shallot aphid ( <i>Myzus ascalonicus</i> ) (MYZUAS) and Melon cotton aphid ( <i>Aphis gossypii</i> ) (APHIGO), data on these can be extrapolated to other species.	
Thrips	Western flower thrip ( <i>Frankliniella occidentalis</i> ) (FRANOC)	
Whiteflies	Glasshouse whitefly, ( <i>Trialeurodes vaporariorum</i> ) (TRIAVA), Tobacco whitefly ( <i>Bemisia tabaci</i> ) (BEMITA)	
Mites	Two-spotted spider mite ( <i>Tetranychus urticae</i> ) (TETRUR)	
		Tarsonemid mites ( <i>Phytonemus pallidus fragariae</i> ) (PHTNFP)
Diptera (fruit flies)	Spotted wing drosophila ( <i>Drosophila suzukii</i> ) (DROSSU)	
Weevil	Vine weevil ( <i>Otiorhynchus sulcatus</i> ) (OTIOSU)	
	Strawberry blossom weevil ( <i>Anthonomus rubi</i> ) (ANTHRU)	
Lepidoptera		Caterpillars sp
Capsid bugs		Tarnished plant bug, <i>Lygus rugulipennis</i> (LYGURU)

**APPLE AND PEAR** (NB in EPPO extrapolation tables, Apple is usually considered key indicator species permitting extrapolation to pear for effectiveness. However, specific crop safety assessments are required on pear).

<b>Pest Group</b>	<b>Crops</b>	<b>Major</b>	<b>Minor</b>
Mites	Apple and Pear	Fruit tree red spider mite ( <i>Panonychus ulmi</i> ) (ANTHRU)	
	Apple		Rust mites ( <i>Aculus schlechtentali</i> ) (VASAD), <i>Epitrimerus pyri</i> (EPITPI)
	Pear	Pear rust mite ( <i>E.pyri</i> ) (EPITPI)	
	Apple and Pear		Pear leaf blister mite ( <i>Phytoptus pyri</i> ) (ERPHPI) Flat scarlet mite ( <i>Cenopalpus pulcher</i> ) (BRVPOU)
Lepidoptera	Apple and Pear	Codling moth ( <i>Cydia pomonella</i> ) (CARPO)	
	Apple (and pear)	Fruit tree tortix moth ( <i>Archips podana</i> ) (CACOPO) Summer fruit tree totrix moth ( <i>Adoxophyes orana</i> ) (CAPURE) (reduced numbers may be possible to cross-support)	
	Apple and Pear		Light brown apple moth ( <i>Epiphyas postvittana</i> ) (TORTPO)
	Apple and Pear		Winter moth ( <i>Operophtera brumata</i> ) (CHEIBR)
	Apple and Pear		Blastobasis moth ( <i>Blastobasis decolorella</i> ) (BLAADE)
Woolly aphid	Apple	Woolly aphid ( <i>Erisoma lanigerum</i> ) (ERISLA)	
Other Aphids	Apple and pear	Rosy apple aphid ( <i>Dysaphis plantaginea</i> ) (DYSAPL)	
	Apple and pear		Leaf curling aphids <i>Dysaphis</i> sp (DYSASP)
	Pear	Pear-bedstraw aphid ( <i>Dysaphis pyri</i> ) (DYSAPY)	
	Apple and Pear		Green apple aphid ( <i>Aphis pomi</i> ) (APHIPO)



	Apple and pear		Apple grass aphid ( <i>Rhopalosiphum insertum</i> ) (RHOPIN)
Psyllids	Apple and pear		Apple sucker ( <i>Psylla mali</i> ) (PSYLMA)
	Pear	Pear sucker ( <i>Cacopsylla pyri</i> ) (PSYLPI)	
Scale	Apple and Pear	Mussel scale ( <i>Lepidosaphes ulmi</i> ) (LEPSUL)	
	Pear only		Pear scale ( <i>Quadraspidiotus pyri</i> ) (QUADOS), (similar species minor in apple)
Capsids	Apple and pear		Common green capsid ( <i>Lygocoris pabulinus</i> ) (LYGUPA) , other capsid species
Leafhoppers	Apple and pear		<i>Edwardsiana crataegi</i> (TYCYFR) and other species
Weevils	Apple and Pear		Rhynchites weevil ( <i>Rhynchites aequatus</i> ) (COENAQ)
	Apple and Pear		Blossom weevils ( <i>Anthonomus</i> spp) (ANTHSP)
Midges	Apple and pear		Apple leaf midge ( <i>Dasineura mali</i> ) (DASMYA), pear leaf midge ( <i>Dasineura pyri</i> ) (DASYPY)
	Pear		pear gall midge ( <i>Contarina pyrivora</i> ) (CONTPY)
Sawflies	Apple and Pear		Hoplocampa spp. (HOPLSP), <i>Ametastegia glabrata</i> (TAXOGL)

## 2. DISEASES

Crop	Major disease; English name, Latin name and EPPO code	No. of fully supportive trials
Sugar beet	Powdery mildew ( <i>Erysiphe polygoni</i> ) (ERYSBE)	6
	Rust ( <i>Uromyces betae</i> ) (UROMBE)	6
Field bean	Leaf and pod spot ( <i>Ascochyta fabae</i> ) (ASCOFA)	6
	Downy Mildew ( <i>Peronospora viciae</i> ) (PEROVI)	6
	Chocolate spot ( <i>Botrytis fabae</i> ) (BOTRFA)	6
Apple	Scab ( <i>Venturia inaequalis</i> ) (VENTIN)	10
	Powdery mildew ( <i>Podosphaera leucotricha</i> ) (PODOLE)	10
	Canker ( <i>Nectria galligena</i> ) (NECTGA)	10
	Botrytis fruit rot (application pre-harvest in field)	6
	Silver leaf ( <i>Chondrostereum purpureum</i> ) (STERPU)	6
Pear	Pear scab ( <i>Venturia pyrina</i> ) (VENTPI)	Use EPPO extrapolation
	Fireblight ( <i>Erwinia amylovora</i> ) (ERWIAM)	6
Onion	White rot ( <i>Stromatinia cepivora</i> (= <i>Sclerotium cepivorum</i> ) (SCLOCE)	6
	Downy mildew ( <i>Peronospora destructor</i> ) (PERODE)	6
	White tip ( <i>Phytophthora porri</i> ) (PHYTPO)	6
Strawberry	Grey mould ( <i>Botrytis cinerea</i> ) (BOTRCI)	6
	Powdery mildew ( <i>Sphaerotheca macularis</i> ) (SPHRMA)	6
Pea	Downy mildew ( <i>Peronospora viciae</i> )(PEROVI)	6
	Leaf and pod spot ( <i>Mycosphaerella pinodes</i> ) (MYCOPI)	6
Ornamentals	Rust ( <i>Puccinia horiana</i> (PUCCHN) and <i>Uromyces dianthi</i> (UROMDI) ) <sup>1</sup>	6
For advice on the number of trials for other major diseases please consult CRD.	Powdery mildew( <i>Sphaerotheca pannosa</i> (SPHRPA), <i>Microsphaera begonia</i> (OIDIBE)and oidium spp) <sup>1</sup>	6

### 3. WEEDS

-Major weeds for the crop	Onion	Apple/pear	Carrot	Grassland	Field bean	Vining / combining peas	Sugar beet
Annual meadow-grass <i>Poa annua</i> (POAAN)	x		x			x	x
Black bindweed <i>Fallopia convolvulus</i> (POLCO)			x		x	x	x
Black nightshade <i>Solanum nigrum</i> (SOLNI)						x	
Black-grass (ALOMY)	x		x		x	x	x
Brambles (RUBFR)				x			
Charlock (SINAR)	x				x		
Cleavers (GALAP)	x	x			x	x	x
Common chickweed (STEME)	x			x	x		
Common couch (AGRRE)		x					x
Common fumitory (FUMOF)	x						
Common nettle (URTDI)		x		x			
Common orache (ATXPA)		x					

<b>-Major weeds for the crop</b>	<b>Onion</b>	<b>Apple/pear</b>	<b>Carrot</b>	<b>Grassland</b>	<b>Field bean</b>	<b>Vining / combining peas</b>	<b>Sugar beet</b>
Common poppy (PAPRH)					x	x	
Common ragwort (SENJA)				x			
Creeping buttercup (RANRE)		x		x			
Docks (RUMSS)		x		x			
Fat-hen (CHEAL)					x	x	x
Field bindweed (CONAR)		x					
Giant hogweed (HERMZ)				x			
Groundsel (SENVU)	x		x				
Knotgrass (POLAV)	x	x	x			x	x
Mayweed spp. (MATSS)	x		x			x	
Pale persicaria (POLLA)			x			x	x
Redshank (POLPE)	x		x			x	x
Rushes (IUUNG)				x			
Small nettle (URTUR)	x						
Speedwell spp (VERSS)					x		
Thistles (CIRSS)		x		x		x	

<b>-Major weeds for the crop</b>	<b>Onion</b>	<b>Apple/pear</b>	<b>Carrot</b>	<b>Grassland</b>	<b>Field bean</b>	<b>Vining / combining peas</b>	<b>Sugar beet</b>
Volunteer cereals (TRZSS, HORSS)					x	x	
Volunteer oilseed rape (BRSNN)	x				x	x	x
Volunteer potatoes (SOLTU)	x		x			x	x
White campion (MELAL)	x						
Wild oats (AVESS)					x	x	x (spring germinating)

x = major weed in the crop in the UK (see introductory text for details).